Panasonic

Safety Laser Scanner

SD3-A1

User's Manual

Safety Instructions

ME-SD3A1SAFE-05

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About the instruction manual (safety instructions) and the instruction manual (connection and operation) of the SD3-A1, and the SD3SOFT instruction manual (software operation)

The instruction manual (safety instructions) and the instruction manual (connection and operation) for the **SD3-A1** contain important information on proper usage of laser scanner and usage in accordance with intended purpose. For additional information on the configuration of the **SD3-A1**, please refer to the **SD3SOFT** instruction manual (software operation).

It is essential to observe all information in the instruction manual (connection and operation) and in the instruction manual (software operation), especially the safety notes.

The instruction manual (connection and operation) and the instruction manual (software operation) must be kept in a safe place. They must be available during the entire period when the **SD3-A1** is in use. Documents are also automatically installed on the PC when **SD3SOFT** is installed and can be viewed at any time with the Help menu.

Safety and warning notices are identified by the symbol .

References to important information are identified by the symbol .

References to the safety of laser devices are identified by the symbol .

Panasonic Industrial Devices SUNX Co., Ltd. is not liable for damage caused by improper usage. The user must also be familiar with all the **SD3-A1** manuals to be able to use the system properly.

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1 Safety notes and usage in accordance with intended purpose

1.1 Safety Notes

The protective function of the devices can be negatively affected, however, if they are used improperly or not in accordance with their intended purposes. If this occurs, it may not be possible to safeguard danger areas completely or at all, which may result in danger to life and limb for persons who are in the general area of the machines or systems.

Please observe the instruction manual (connection and operation) for the **SD3-A1** and the instruction manual (software operation) for the **SD3SOFT**. Both documentation sources are available on the CD-ROM and they are automatically installed on the PC, where they can be viewed at any time with the **SD3SOFT** Help menu, even if the CD is not inserted.

Caution – laser radiation! The **SD3-A1** is a laser device of Laser class 1. Note applicable legal and national requirements for operating laser systems. Avoid positioning the scanner at eye level.

1.2 Check the safety functionality regularly

When placing the system in service for the first time, when it has been out of service for some time, after conversions and repair work, make certain the scanner performs its protective function with no problems and that all other safety-related parts have been verified to be in good working order by the person who is authorized and responsible for that task. This must be done taking into consideration applicable national requirements, especially for guidelines on machines and using work material. If the correct functionality is not clearly confirmed, turn the machine or vehicle OFF immediately.

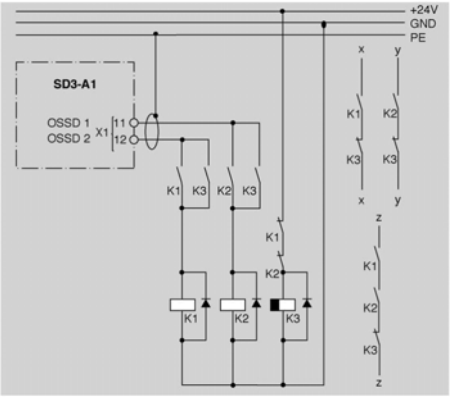
The **SD3-A1** is a safety-oriented laser scanner of Category Type 3. It is extremely important to verify the problem-free protective function of the device on a regular basis. This includes having a qualified person verify the effectiveness of the overall protective device at least once a year as well as operating personnel monitoring basic safety functions on a daily basis. There are checklists for this purpose in the instruction manual (connection and operation).

1.3 Usage requirements and usage in accordance with intended purpose

Applicable machine safety requirements govern the use of the **SD3-A1**. Responsible authorities (for example professional trade unions, OSHA) are also available for questions related to safety. In general, the following usage requirements must be observed:

- The **SD3-A1** corresponds to Type 3 in accordance with IEC 61496-1 and –3. A safety category of 3 in accordance with ISO 13849-1 can be achieved with the **SD3-A1** if all other elements in the safety chain are set up to stop the dangerous motion in accordance with that safety category.
- The **SD3-A1** is designed for use in enclosed rooms and for the usage parameters specified in the technical data.
- It must not be used with internal combustion engines.
- The electrical connection of the **SD3-A1** to the control system must only be made by an electrician.

- The 24V DC power supply (+20%, -30%) must be ensured by a safe network disconnect in accordance with IEC 60742. The same requirements apply to all connected input and output circuits.
- The 24V DC power must be supplied to the laser scanner through a separate branch with a 1.25A delayed action fuse in the control cabinet.
- You must ensure that protective caps are screwed onto interfaces X1 and X2. This will protect the interfaces against dust.
- Reflective surfaces (glass, mirrors, retro-reflectors, etc.) on fixed contours must be avoided on the scanning level within the limits of the detection zone and up to 1.2m beyond them. If this is not possible, an additional detection zone must be provided.
- The safety output has a double design. The two OSSDs must always be included in the shut-off circuit of the machine in such a manner that either of the two is completely sufficient by itself to turn OFF the motion that presents a danger.
- The alarm output 1 (Pin 5 on X1) must not be used to switch safety-related signals.
- Tampering with or making modifications to the **SD3-A1** could result in loss of the safety functionality.



Relays K1 and K2 must have forced contacts. They are operated directly on the two secure semi-conductor outputs OSSD 1 and OSSD 2. Relay K3 has a de-energizing delay. A suitable mechanism must be provided for extinguishing sparks. Please note that doing this will cause the switching time to be extended. Channels “x” and “y” must be integrated for Category 3 in accordance with ISO 13849-1. Integrating one channel based on “z” is only permitted with a one-channel control system and taking into consideration the results of a risk analysis.

Fig. 1.3-1: Example of integrating both OSSDs into a work circuit

2 Notes related to determining detection zone contours

The calculation formulas specified in IEC 61496-3 and ISO 13855 must be observed when defining the detection zones and the minimum detection zone depth! Please consider also any higher-priority machine standards (for example DIN EN 1525; Safety of industrial trucks – Driverless trucks and their systems). Both of these standards contain individual requirements, and in particular detection zone additions to be considered. They provide information on how to measure safety distances on specific machines.

This detection zone also includes an additional area in case of possible measurement errors where the possibility of a detection zone violation cannot be ensured under all circumstances. The necessary detection zone additions must be taken into consideration.

They vary from one application to another and each one must be considered separately. For the exact dimensions of additions, please refer to the laser scanner status message or the manual.

In general, a protective function that does not provide any protection, or that provides insufficient protection, requires additional safety measures (for example guard fences, light curtains, restart inhibit, etc.)!

- Access to the detection zone in the dangerous area is not permitted.
- Detection zones with a radius of less than 20cm (area immediately next to the scanner) are not permitted and will not be accepted in the scanner configuration.
- Needle-shaped detection zone contours are not permitted, since they do not ensure any protective effect.

3 Installation of the SD3SOFT software and manuals

Please insert the CD-ROM in the appropriate drive. If the software settings of your PC allow it, the **SD3SOFT** installation routine starts automatically. It is also possible to start the routine manually by running “start.exe” from the CD-ROM.

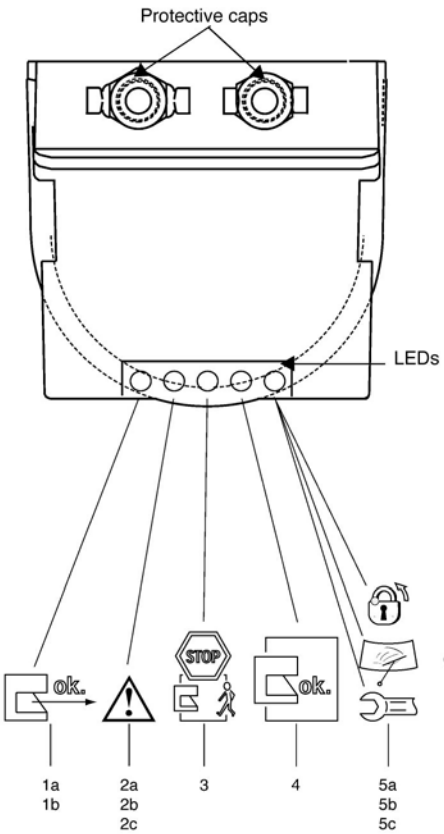
ⓘ The installation path for **SD3SOFT** is “C: \ Program Files \ SUNX \ SD3SOFT”. All manuals are stored in the “ \ manual” subdirectory in PDF format. You can bring them up and view them at any time after installation, even without starting **SD3SOFT**.

After you start the program – run **SD3SOFT** in the Programs menu – the software attempts to make a connection to a scanner. If no scanner is connected, the program starts in offline mode. You can work with **SD3-A1** configurations in this mode. You must be logged in as an “authorized user” to be able to edit a configuration. You will find the appropriate password in the **SD3-A1** manuals. **Please note:** You should become extensively familiar with the safety notes and manuals before editing the configuration and detection zone definitions of the **SD3-A1**.

4 Technical Data

4.1 The SD3-A1

Status displays on the **SD3-A1**



1a= Sensor function

1b= Errors on the zone pair control inputs, Light flashing at 2Hz

2a= Warning zone is occupied

2b= Optical window is dirty, Light flashing at 2Hz

2c= ConfigPlug configuration not compatible, Light flashing at 4Hz

3 = OSSDs are turned OFF

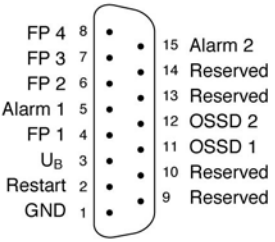
4 = OSSDs are turned ON

5a= Restart inhibit locked, Continuous light

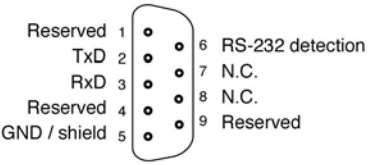
5b= Optical window is dirty, Light flashing at 2Hz

5c= Fault, light flashing at 4Hz

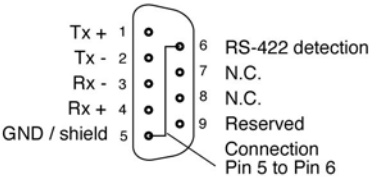
Assignment of interface X1



Assignment of interface X2 as RS-232 port



Assignment of interface X2 as RS-422 port



4.2 Electrical Connection

Power supply:	24V DC +20% / -30%, power supply as specified in IEC 60742 with safety transformer, protected by a 1.25A delayed action fuse
OSSD outputs:	2 × secure semiconductor output PNP max. 250mA, monitored for short-circuits
Alarm outputs:	2 × PNP semiconductor output, max. 100mA
Inputs:	24V DC, insulated by photocoupler; signal definition: high / logical 1 → 16 to 30V, low / logical 0 → < 3V

4.3 Assignment of Interface X1

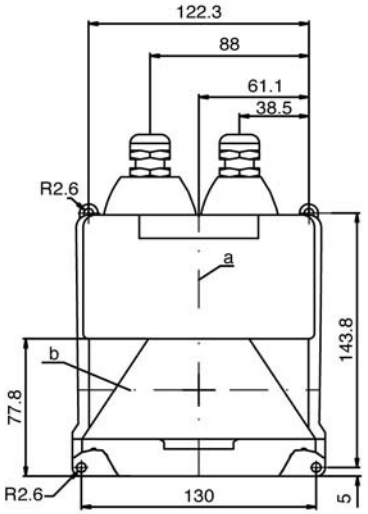
Pin - Pin number on the scanner's plug bar
Color code - Color code of the 15-pin connection cable

Pin	Color code	Signal	Description
1	Black	GND	Power supply ground
2	Blue	Restart	Input, scanner reset and restart button connection
3	Red	U_B	24V DC power supply; protected by a 1.25A delayed-action fuse
4	Orange	FP 1	Zone pair control input
5	Yellow	Alarm 1	Semiconductor output with shut-off when warning field is violated plus warning and malfunction messages (functions can also be adjusted in combination)
6	Green	FP 2	Zone pair control input
7	Violet	FP 3	Zone pair control input
8	Gray	FP 4	Zone pair control input
9		Reserved	Internally connected
10		Reserved	Internally connected
11	White	OSSD 1	Semiconductor output, shut-off if the active detection zone, channel 1 is violated
12	White / Black	OSSD 2	Semiconductor output, shut-off if the active detection zone, channel 2 is violated
13		Reserved	Internally connected
14		Reserved	Internally connected
15	Brown	Alarm 2	Semiconductor output with shut-off when warning and malfunction message (> FW 5.1)

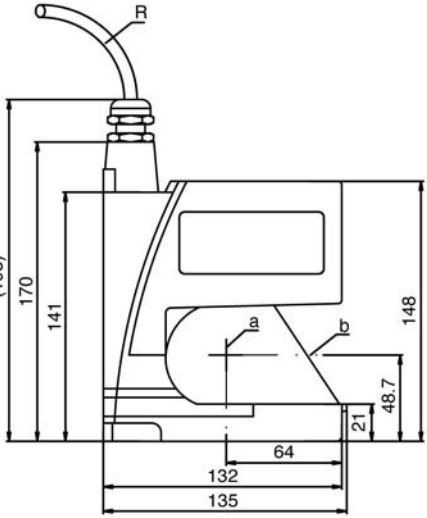
Table 4.3-1: Description of interface X1

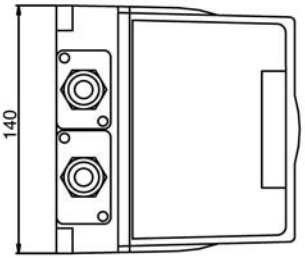
5 Dimensional Drawings of the SD3-A1

Front view



Side view





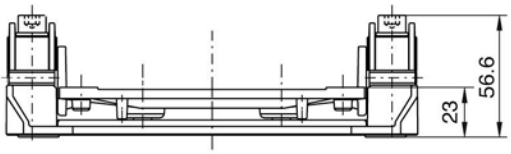
View from above

R = Smallest bending radius = 50mm (SUNX accessory)
a = Axis of the rotating mirror
b = Scanning plane

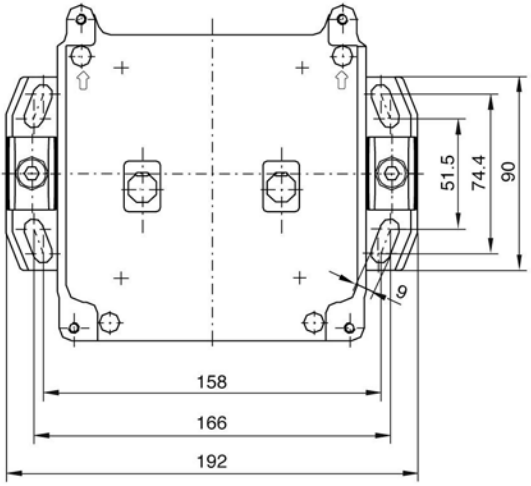
All dimensions given in mm

6 Dimensional Drawings of the Mounting System

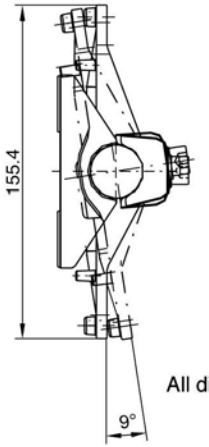
Side view



Scanner mounting-surface



Overview of parts



All dimensions given in mm

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